A Numerical Model Simulation for an Updraft Gasifier Using High-Temperature Steam

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Abstract : A mathematical model study was carried out to investigate gasification of biomass fuels using high-temperature air and steam as a gasifying agent using high-temperature air up to 1000°C. In this study, a 2D computational fluid dynamics model was developed to study the gasification process in an updraft gasifier, considering drying, pyrolysis, combustion, and gasification reactions. The gas and solid phases were resolved using a Euler−Euler multiphase approach, with exchange terms for the momentum, mass, and energy. The standard k−ε turbulence model was used in the gas phase, and the particle phase was modeled using the kinetic theory of granular flow. The results show that the present model giving a promising way in its capability and sensitivity for the parameter effects that influence the gasification process.

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